

Tested Light Source - 1\_PHOT\_NINETY-NINE-1650lmChip-2700K-WallWash-HoneycombLouvre\_2309

Laboratory and Equipment

Laboratory Owner and Location  
Goniospectrometer System and Type  
Spectrometer Manufacturer and Model

Factorylux, Greenhill Mills, Hebden Bridge, HX7 5QF, UK  
BaseSpion – Type C, horizontal  
Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

Measurement Conditions

Number of C-planes and Resolution  
γ (gamma)-Resolution  
Test Distance  
Input Power, Power and Displ. Factors  
Input RMS Voltage and Current  
Frequency of Input Power

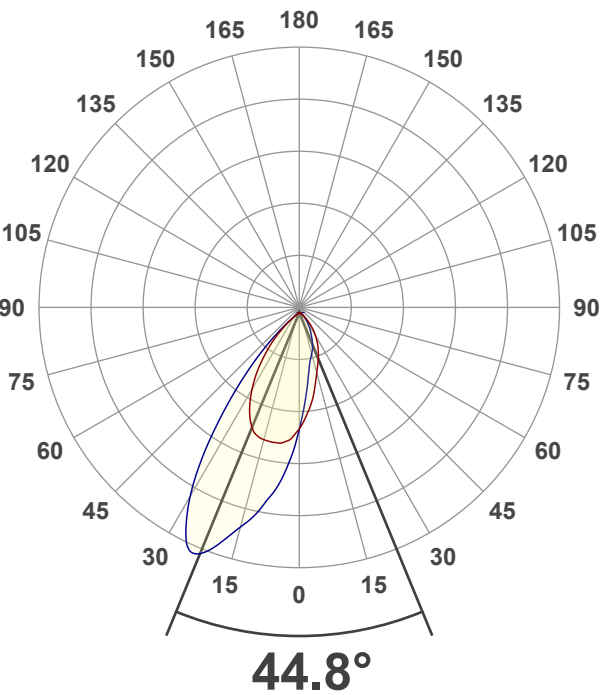
24 planes – 15°  
1.5°  
1.50 m  
13.4 W – PF 0.98 – DPF 0.99  
240 V – 0.057 A  
50.1 Hz

Main Light Measurement Results

Output  
Efficiency  
Peak Intensity and Beam Angle  
Color Rendering Index

435 lm  
32 lm/W  
706 cd – 44.8°  
CRI 92.4

Light Intensity Distribution



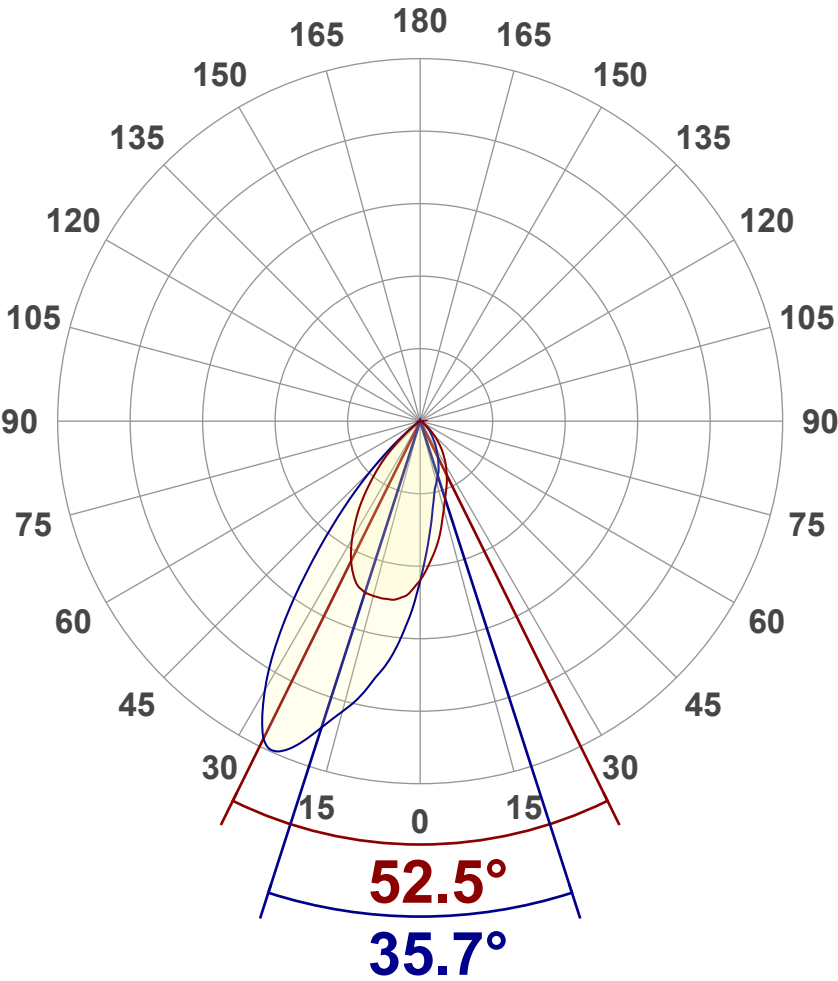
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Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	435 lm
Peak Intensity	706 cd
Beam Angle (50%)	44.8°
Beam Angle (90%)	35.7°
Beam Angle (10%)	57.8°

Cut-off Angle

Average 2,5%	107.1°
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Field Angle

Average 10%	86.7°
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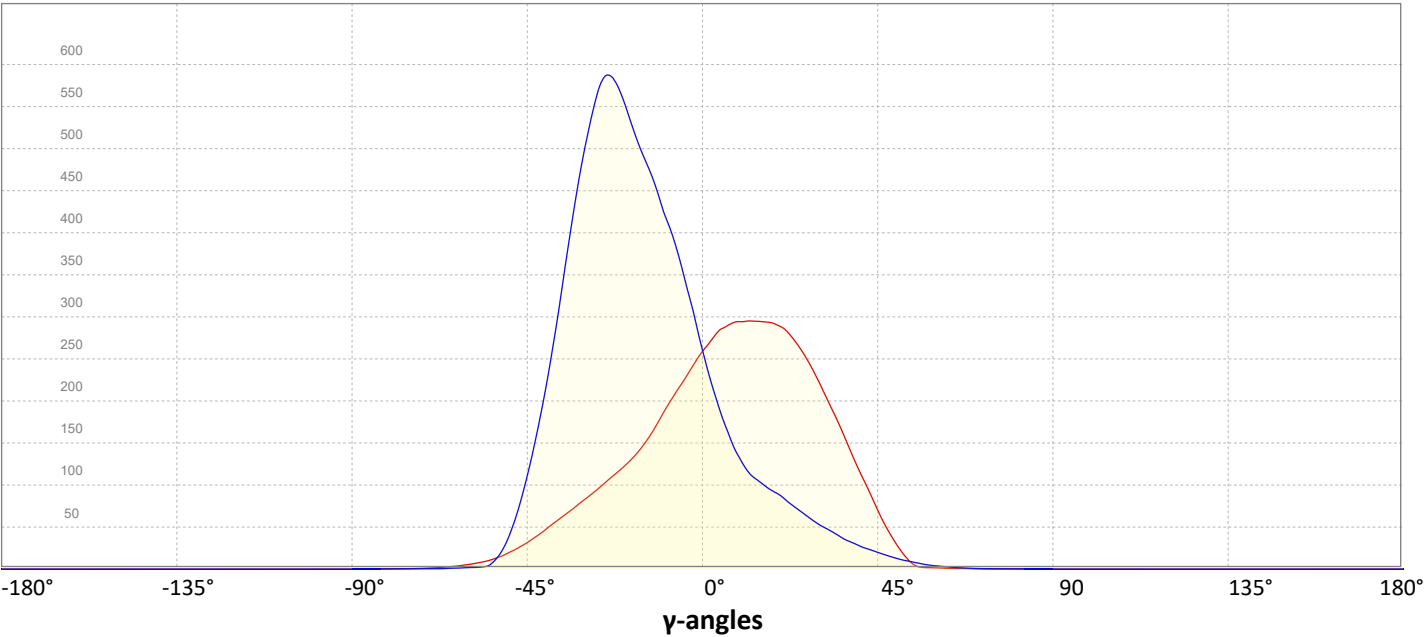
Intensity Ratio

In 120° cone	99.3%
In 90° cone	92.8%

C000-C180

C090-C270

Linear distribution diagram - Intensity (candela) vs γ-angle

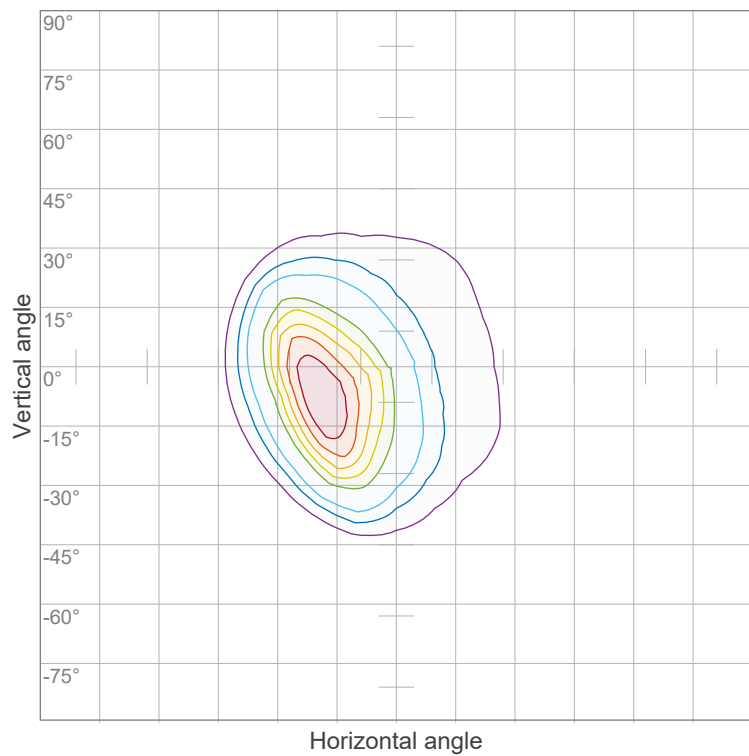


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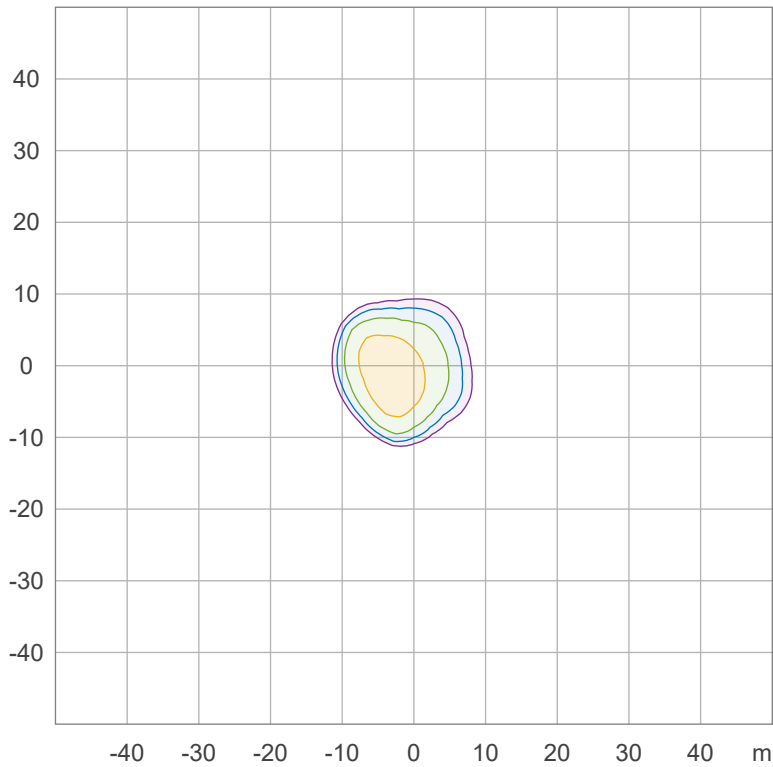
## Iso-intensity Diagram (Iso-candela)



90 %	634.0 cd
80 %	563.6 cd
70 %	493.1 cd
60 %	422.7 cd
50 %	352.2 cd
40 %	281.8 cd
30 %	211.3 cd
20 %	140.9 cd
10 %	70.4 cd

Peak intensity: 704.5 cd  
Number of c-planes: 24

## Iso-illuminance Diagram (Iso-lux)



50.0 %	2.9 lx
30.0 %	1.7 lx
10.0 %	0.6 lx
5.0 %	0.3 lx
3.0 %	0.2 lx

Peak illuminance: 5.8 lx  
Mounting height: 10.0 m  
Number of c-planes: 24

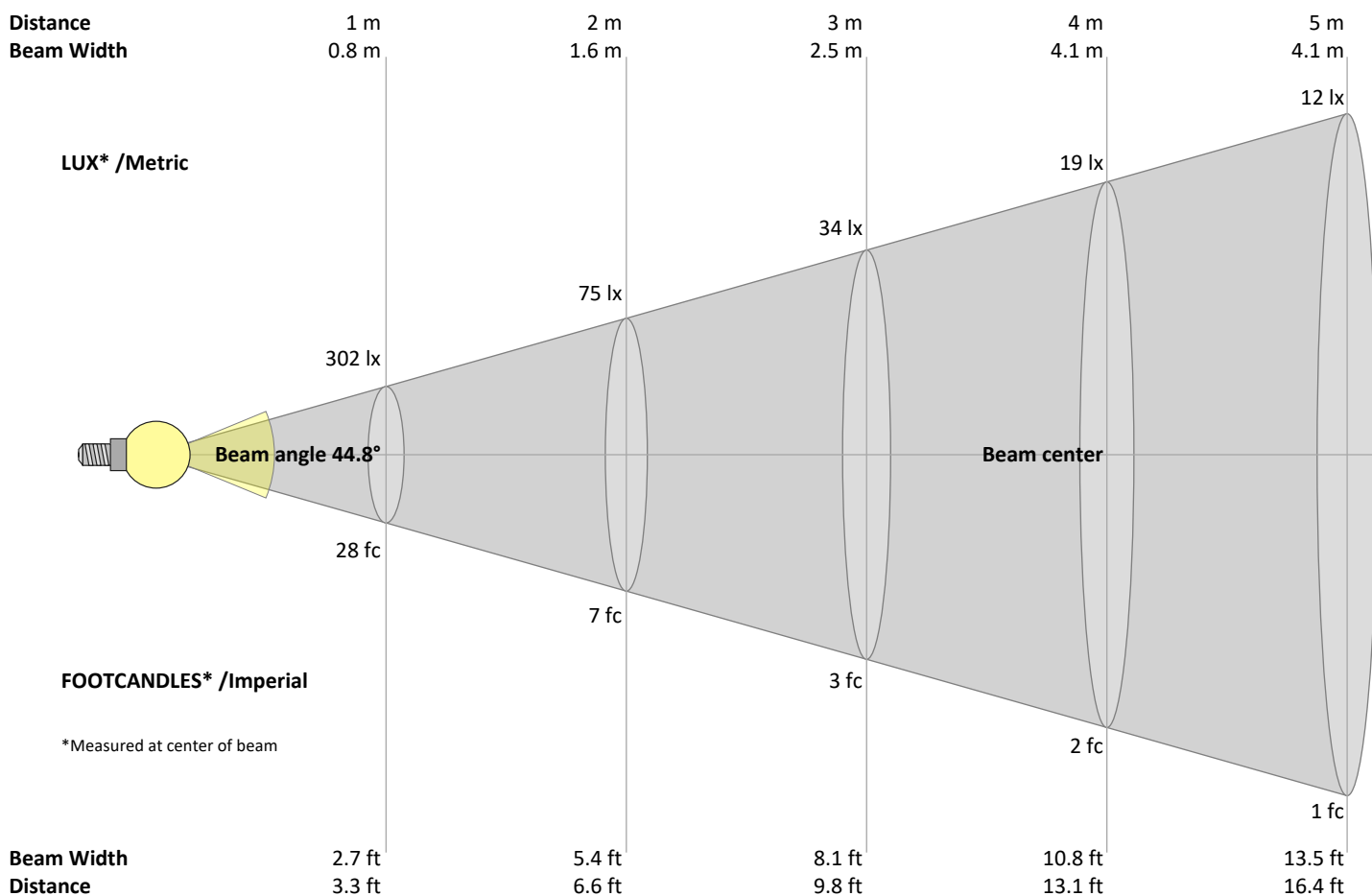
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## Beam Details



### Beam intensities from 1 – 20 m

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	m
3.3	6.6	9.8	13.1	16.4	19.7	23	26.2	29.5	32.8	36.1	39.4	42.7	45.9	49.2	52.5	55.8	59.1	62.3	65.6	ft
302	75	34	19	12	8	6	5	4	3	2	2	2	2	1	1	1	1	1	1	lux
28	7	3.1	1.8	1.1	0.8	0.6	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	fc

### Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
302	283	266	249	233	215	196	179	165	152	142	132	123	114	105	97	88	80	72	64	cd
100%	94%	88%	83%	77%	71%	65%	59%	55%	50%	47%	44%	41%	38%	35%	32%	29%	26%	24%	21%	of 0°val

### Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
302	260	226	195	168	148	132	123	115	107	101	92	84	76	68	61	55	49	43	38	cd
100%	86%	75%	65%	56%	49%	44%	41%	38%	36%	34%	31%	28%	25%	23%	20%	18%	16%	14%	12%	of 0°val

### Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
302	312	326	333	338	340	341	340	339	338	333	324	311	295	277	256	233	211	187	162	cd
100%	104%	108%	110%	112%	113%	113%	113%	112%	112%	110%	107%	103%	98%	92%	85%	77%	70%	62%	54%	of 0°val

### Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
302	345	386	427	462	491	524	552	578	607	639	665	677	667	632	583	526	460	389	319	cd
100%	114%	128%	142%	153%	163%	174%	183%	191%	201%	212%	220%	224%	221%	209%	193%	174%	152%	129%	106%	of 0°val

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*Uncorrected, comprehensive UGR table according to 117-1995*

[illegible]

### Coefficients of Utilization

Ceiling reflectance	80			70			50			30			10			0		
Wall reflectance	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
Floor reflectance	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0
RCR (RCR: Room Cavity Ratio) Room Values are expressed as percentage of Lumen delivered to the task surface																		
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	113	110	107	105	110	108	105	103	104	102	100	100	98	97	96	95	94	92
2	107	101	97	93	104	99	95	92	96	93	90	93	90	88	90	88	86	84
3	100	93	88	83	98	92	87	83	89	85	81	87	83	80	84	81	79	77
4	94	86	80	75	93	85	79	75	83	78	74	81	76	73	79	75	72	71
5	89	80	73	68	87	79	73	68	77	71	67	75	70	67	73	69	66	65
6	84	74	67	62	82	73	67	62	71	66	62	70	65	61	69	64	61	59
7	79	69	62	57	77	68	62	57	66	61	57	65	60	56	64	60	56	54
8	74	64	57	53	73	63	57	52	62	56	52	61	56	52	60	55	52	50
9	70	60	53	49	69	59	53	48	58	52	48	57	52	48	56	51	48	46
10	66	56	49	45	65	55	49	45	54	49	45	54	48	45	53	48	45	43

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	29 lm	6.6%
10-20°	86 lm	19.7%
20-30°	133 lm	30.6%
30-40°	120 lm	27.6%
40-50°	55 lm	12.7%
50-60°	9 lm	2.1%
60-70°	2 lm	0.5%
70-80°	1 lm	0.1%
80-90°	0 lm	0.1%
90-100°	0 lm	0.0%
100-110°	0 lm	0.0%
110-120°	0 lm	0.0%
120-130°	0 lm	0.0%
130-140°	0 lm	0.0%
140-150°	0 lm	0.0%
150-160°	0 lm	0.0%
160-170°	0 lm	0.0%
170-180°	0 lm	0.0%
Total	435 lm	100.0%

Intensity peaks

Max intensity	706 cd
Intensity, 90°	0 cd
Intensity, 0°	302 cd

Zonal Lumen summary

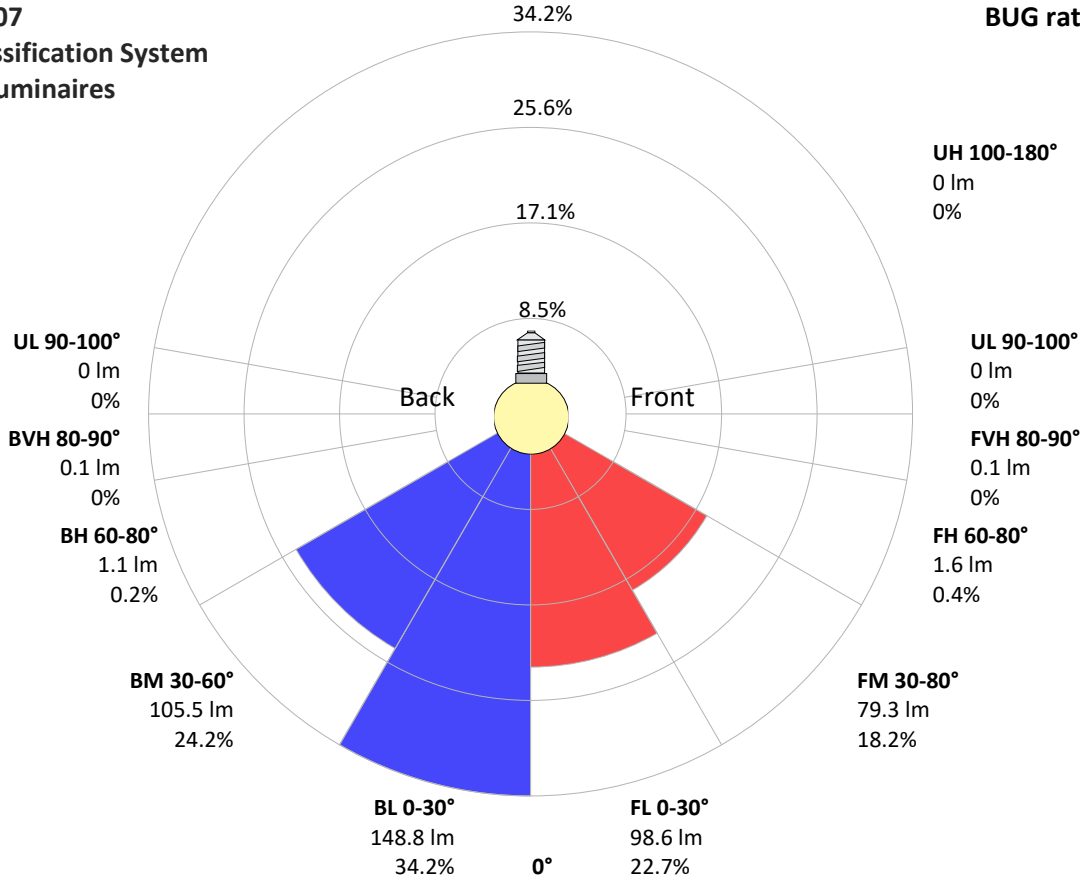
Zone (γ)	Lumen	% Total
0-30°	247 lm	56.9%
0-40°	367 lm	84.5%
0-60°	432 lm	99.3%
60-90°	3 lm	0.7%
70-100°	1 lm	0.2%
90-120°	0 lm	0.0%
0-90°	435 lm	100.0%
90-180°	0 lm	0.0%
0-180°	435 lm	100.0%

BUG rating

	Lumen	% Total
<b>Forward light</b>		
Low(0-30°)	99 lm	22.7%
Medium(30-60°)	79 lm	18.2%
High(60-80°)	2 lm	0.4%
Very high(80-90°)	0 lm	0.0%
<b>Back light</b>		
Low(0-30°)	149 lm	34.2%
Medium(30-60°)	105 lm	24.2%
High(60-80°)	1 lm	0.2%
Very high(80-90°)	0 lm	0.0%
<b>Uplight</b>		
Low(90-100°)	0 lm	0.0%
High(100-180°)	0 lm	0.0%

IESNA TM-15-07  
Luminaire Classification System  
For Outdoor Luminaires

BUG rating B1 U1 G0



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## Power Details

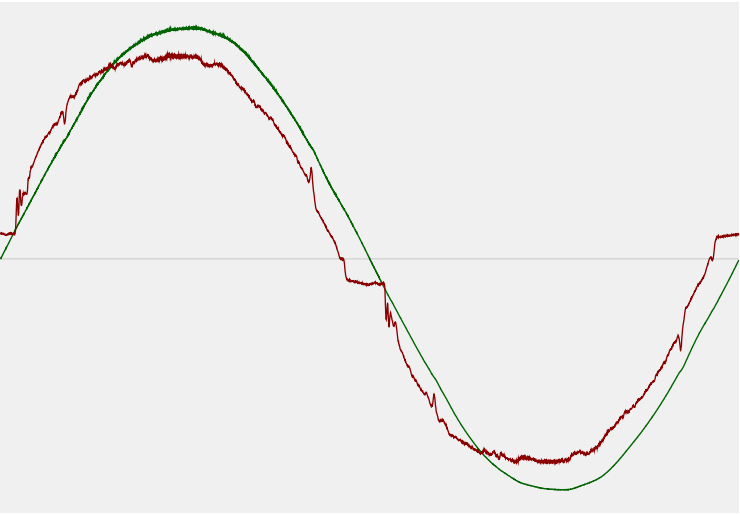
### Input Power

Power feed to light source	13.4 W
Frequency of input power	50.1 Hz
RMS Input voltage feed, $V_{RMS}$	240 V
RMS Input current feed, $I_{RMS}$	0.057 A
Volt-Ampere or apparent power = $V_{RMS} \cdot I_{RMS}$	13.64 VA
Displacement factor of AC power feed	0.99
Power factor of AC current feed	0.98
Total harmonic distortion of the current	6.63%
Total harmonic distortion of the voltage	1.12%

### Efficiency

Radiated power efficiency	11.9%
<div><div></div></div>	
Lumen efficiency	32 lm/W
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### Input Power Curve





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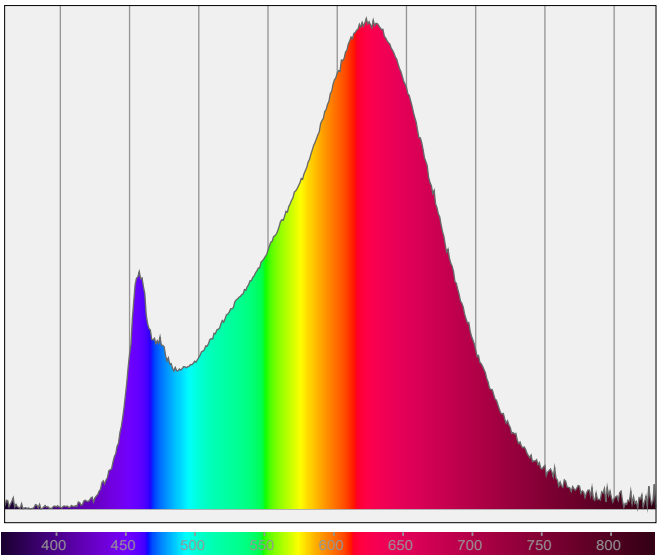
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## Color Measurements

Correlated Color Temperature	CCT = 2700 K
Color Rendering TM30-18	R <sub>f</sub> 91.0 — R <sub>g</sub> 98.9
Color Shift, CIE duv	Duv ±0.0003

## Spectral distribution



## Color details

Correlated Color Temperature	CCT = 2700 K	Color coordinates CIE 1931	(x;y) = (0.460;0.411)
Color Rendering Index	CRI 92.4	Color coordinate CIEs 1960	(u;v) = (0.263;0.352)
Color Rendering Index, R9 (red component)	R9 = 66.8	Color deviation from BBL	Duv = ±0.0003
Color Rendering TM30-18	R <sub>f</sub> 91.0 — R <sub>g</sub> 98.9	Color coordinate CIEs 1976 (CIELUV)	(u';v') = (0.263;0.263)
Color Quality Scale	CQS = 90.3		

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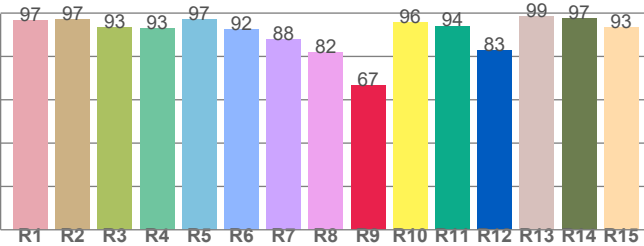
CIE 1931



CIE 1931 – zoomed on Planckian locus



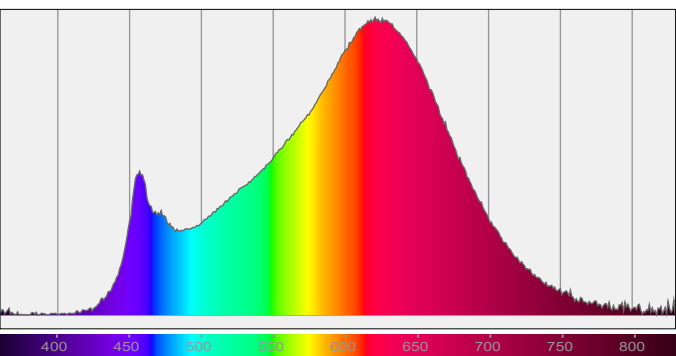
Color Rendering Index per reference color (CIE 1995)



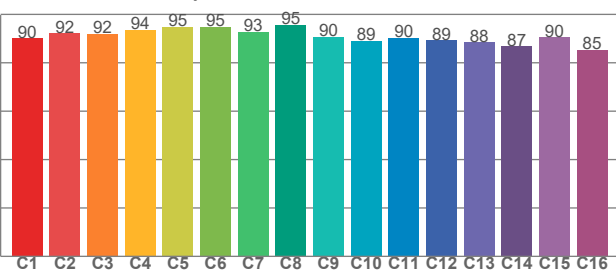
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
96.6	97.1	93.3	92.8	97.0	92.4	87.8	81.8	66.8	95.6	94.1	82.9	98.6	97.5	93.3

Spectral power distribution (SPD) / W/nm – 0-100%



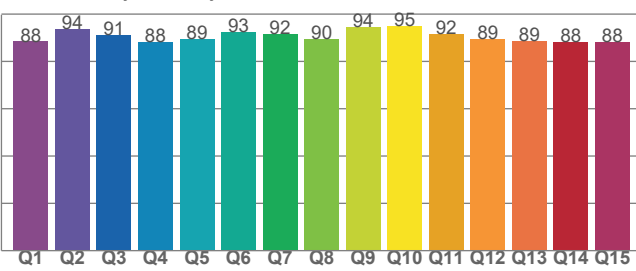
TM30-18 Rf-values per hue bin



TM30 C values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
90.1	92.1	91.9	93.6	94.9	94.6	92.8	95.5	90.5	89.0	90.3	89.2	88.3	86.7	90.4	85.2

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
88.4	93.7	91.3	88.1	89.5	92.5	91.6	89.6	94.5	94.9	91.6	89.3	88.6	87.9	88.1